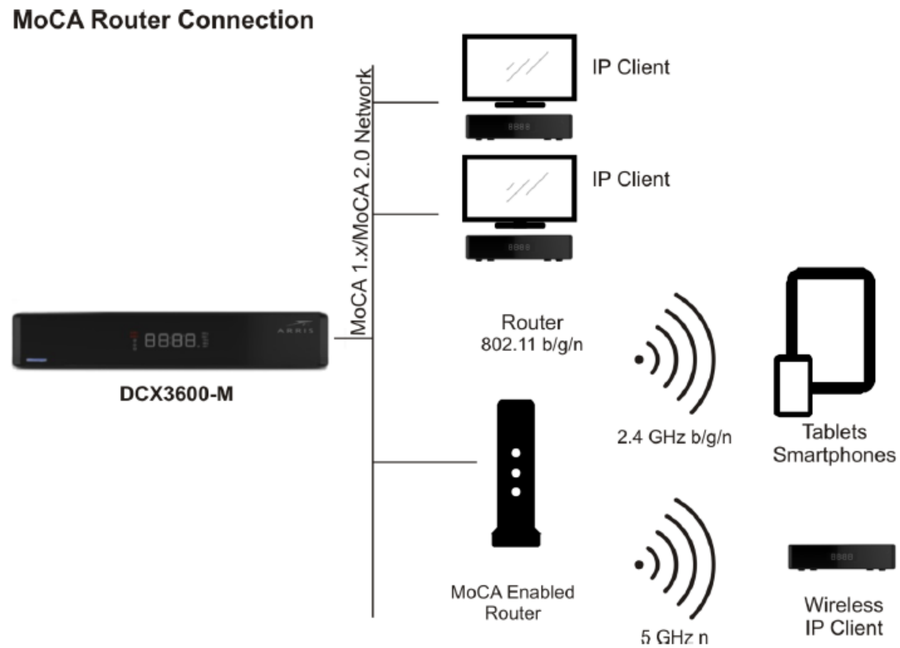
EXHIBIT 6

U.S. Patent No. 7,889,759 ("the '759 Patent") Exemplary Infringement Chart

The Accused MoCA Instrumentalities are instrumentalities that Charter deploys to provide a whole-premises DVR network over an on-premises coaxial cable network, with devices operating with data connections compliant with MoCA 1.0, 1.1, and/or 2.0. The Accused MoCA Instrumentalities include the Charter Arris DCX3510, Charter Arris DCX3520, Charter Arris DCX3600, Charter Arris DCX3200, Charter Arris DCX3220, and substantially similar instrumentalities. Charter literally and/or under the doctrine of equivalents infringes the claims of the '759 Patent under 35 U.S.C. § 271(a) by using the Accused MoCA Instrumentalities.

U.S. Patent No. 7,889,759	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 2 of the '759 Patent
2. A method for determining a common bit-loading modulation scheme for communicating between a plurality of nodes in a broadband cable network ("BCN"), the method comprising:	The Accused Services are provided using at least the Accused MoCA Instrumentalities including gateway devices (including, but not limited to, the Charter Arris DCX3510, Charter Arris DCX3520, Charter Arris DCX3600, and devices that operate in a similar manner), client devices (including, but not limited to, the Charter Arris DCX3200, Charter Arris DCX3220, and devices that operate in a similar manner), and substantially similar instrumentalities. The Accused MoCA Instrumentalities operate to perform method for determining a common bit-loading modulation scheme for communicating between a plurality of nodes in a broadband cable network ("BCN") as described below. The Charter full-premises DVR network constitutes a broadband cable network as claimed. The Charter full-premises DVR network is a MoCA network created between gateway devices and client devices using the on-premises coaxial cable network. This MoCA network is compliant with MoCA 1.0, 1.1, and/or 2.0. "The MoCA system network model creates a coax network which supports communications between a convergence layer in one MoCA node to the corresponding convergence layer in another MoCA node."

	(MoCA 1.0, Section 1. See also MoCA 1.1, Section 1.1; MoCA 2.0, Section 1.2.2) "The MoCA Network transmits high speed multimedia data over the in-home coaxial cable infrastructure." (MoCA 1.0, Section 2. See also MoCA 1.1, Section 2; MoCA 2.0, Section 5) "Broadcast Bit Loading (BBL) – This transmission format is used by each node when transmitting simultaneously to all nodes in the network. The transmission format is derived by each transmitting node to be the common set of transmission parameters based on unicast transmission format from the transmitting node to each other node in the network." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node. A single MoCA Network must support communications of 2 to 8 MoCA nodes. Each MoCA node must support point-to-point and broadcast modulation profiles with all other MoCA nodes." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1)

	Charter utilizes the MoCA standard to provide an on-premises DVR network over an on-premises coaxial cable network as shown below:  Figure 5 - A Typical Mixed MoCA/WiFi Home Network
transmitting a probe signal from a transmitting node within the plurality of nodes to a sub-plurality of receiving nodes within the plurality of nodes;	The Accused MoCA Instrumentalities operate to transmit a probe signal from a transmitting node within the plurality of nodes to a sub-plurality of receiving nodes within the plurality of nodes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that transmit a probe signal from a transmitting node within the plurality of nodes to a sub-plurality of receiving nodes within the plurality of nodes.

	"While it is physically a shared medium, the logical network model is a fully meshed collection of point-to-point links, each with its own unique channel characteristics and channel capacity. MoCA devices use optimized PHY parameters between every point to point link. Each set of optimized PHY parameters is called a PHY Profile. Because each link is unique, it is critical that all nodes know the source and the destination for every transmission." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2; MoCA 2.0, Section 1.2.2) "The topology of the in-home coax typically results in a multi-path delay profile. Because the echoes can be stronger and/or weaker than the original signal, depending on the output port-to-output port isolation of the jumped splitter, the channel is said to have either pre- or post-echoes, respectively. A zero decibel echo, i.e., equal power to the main path, leads to deep nulls in the frequency domain spectrum. In order to achieve target packet error rates of less than 10-5 for large packets (>1500 bytes) with no retransmissions, the MoCA physical layer uses channel pre-equalization (using bit loading) and multi-tone modulation on all links." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2) "ACMT is a variation of orthogonal frequency division multiplexing (OFDM) where knowledge of the channel is used to pre-equalize all signals using variable bitloading on all subcarriers. The term used to describe the bitloading of the ACMT subcarriers is "modulation profile" and the process of creating a modulation profile between a node pair is called "modulation profiling". During periodic modulation profiling, probes are sent between all nodes and analyzed. After probe analysis, modulation profiles are chosen to optimize individual link throughput while maintaining a low packet error rate."

	(MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5) "A variety of physical layer frequency-domain and time-domain probes are used to create modulation profiles, optimize performance, and allow for various calibration mechanisms. Type I Modulation Profile Probes are frequency domain probes used to determine modulation profiles of the channel between any two nodes. Type II Probes are frequency domain probes consisting of two tones that may be used to fine tune performance. A Type III Echo Profile Probe may be used to determine the impulse response of the channel. This information can be used to optimize various physical layer parameters. In addition to the above probes, this specification provides opportunities for various unique Loopback Transmissions which may be useful for RF calibration, among other things." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2)

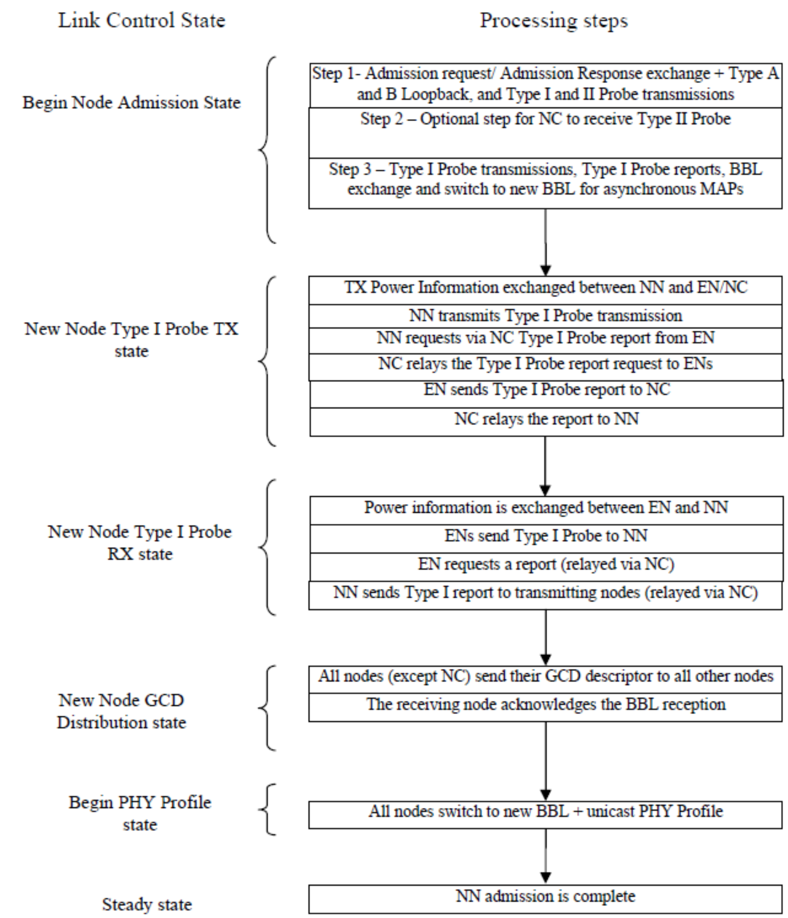
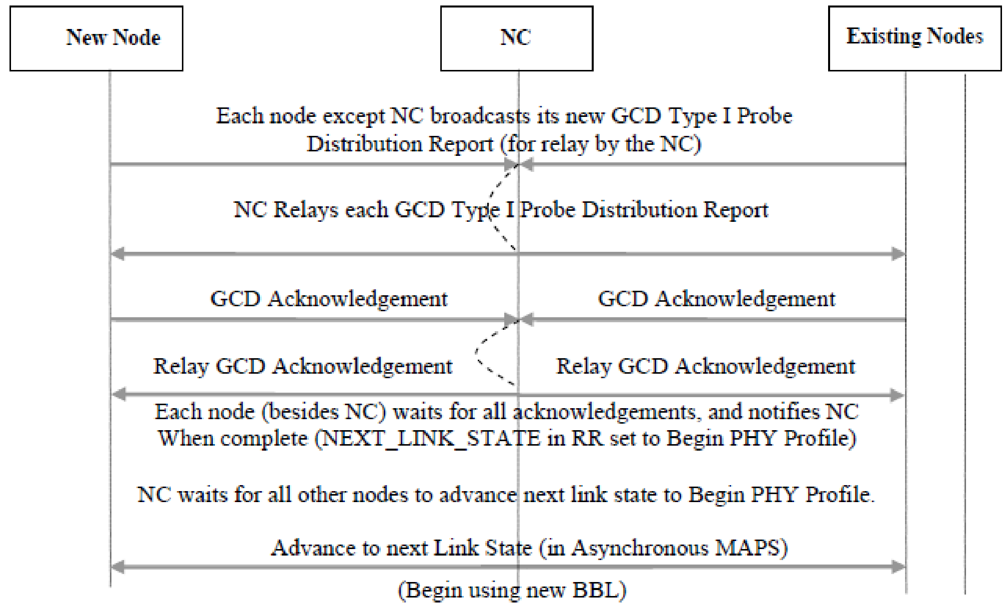


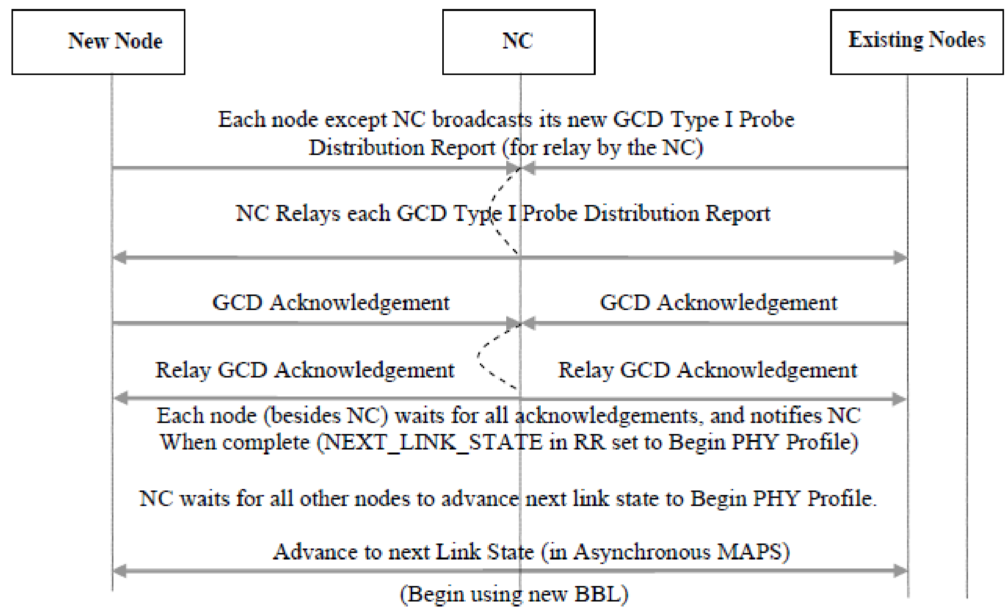
Figure 3-4. Flowchart of the Steps Involved in Admitting a Node to the Network

(MoCA 1.0, Figure 3-4. *See also* MoCA 1.1, Figure 3-6; MoCA 2.0, Figure 8-3)

"When an EN receives Type I Probe Report, it MUST begin reporting New Node GCD Distribution state to the NC. The NN MUST begin reporting New Node GCD Distribution state in its reservation requests (byte code 0x04

	NEXT_LINK_STATE field) after it sends the Type I Probe Report for all nodes in the network." (MoCA 1.0, Section 3.6.6. *See also* MoCA 1.1, Section 3.6.6, MoCA 2.0, Section 8.3.7)  **Figure 3-10. Messages Exchanged during the New Node GCD Distribution State** (MoCA 1.0, Figure 3-10. *See also* MoCA 1.1, Figure 3-12; MoCA 2.0, Figure 8-11) "GCD PHY Profile Transmission from NN and ENs: This message is sent by each node, except NC, to all other nodes (including NC). This report is sent in the form of a Type I Probe Report (Section 3.6.3.2) with RELAY_FLAG = 1 for NC to relay the report to the rest of the nodes in the network. The report

	informs receiving nodes of the PHY profile that the node wishes to use for broadcast messages and asynchronous MAPs (if the node becomes NC)." (MoCA 1.0, Section 3.6.6.1. *See also* MoCA 1.1, Section 3.6.6.1, MoCA 2.0, Section 8.3.7)
receiving a plurality of response signals from the sub-plurality of receiving nodes wherein each response signal includes a bit-loading modulation scheme determined by a corresponding receiving node;	The Accused MoCA Instrumentalities operate to receive a plurality of response signals from the sub-plurality of receiving nodes wherein each response signal includes a bit-loading modulation scheme determined by a corresponding receiving node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that receive a plurality of response signals from the sub-plurality of receiving nodes wherein each response signal includes a bit-loading modulation scheme determined by a corresponding receiving node.

	 **Figure 3-10. Messages Exchanged during the New Node GCD Distribution State** (MoCA 1.0, Figure 3-10. *See also* MoCA 1.1, Figure 3-12; MoCA 2.0, Figure 8-11) "Following the Type I Probe Report from the NN and ENs, the NC MUST relay the report to the other nodes in the network. The NC MUST NOT change the Type I Probe Report payload when relaying the information." (MoCA 1.0, Section 3.6.6.2. *See also* MoCA 1.1, Section 3.6.6.2, MoCA 2.0, Section 8.3.7) "Each node, upon receiving GCD Distribution report from another node, MUST send this acknowledgement to the sender node (relayed via the NC). Also, each node MUST start reporting "Begin PHY Profile" state in its reservation request after it has received the acknowledgments and GCD Distribution reports from all other nodes."

	(MoCA 1.0, Section 3.6.6.3. *See also* MoCA 1.1, Section 3.6.6.3, MoCA 2.0, Section 8.3.7) "Once each node begins to send "Begin PHY Profile" state in its reservation request the NC MUST advance the Link Control state to Begin PHY Profile state. When EN's and NN receive this Link Control state indication, they can begin using newly computed PHY profiles (including transmit power settings) as described in Section 3.13.3." (MoCA 1.0, Section 3.6.7. *See also* MoCA 1.1, Section 3.6.7, MoCA 2.0, Section 8.3.9) "The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7)

	Table 3-27. Type I Probe Report Calculated Parameters (table below) (MoCA 1.0, Table 3-27. *See also* MoCA 1.1, Table 3-33, MoCA 2.0, Table 6-32) "The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received

Parameter	Explanation
PREAMBLE_TYPE	Preamble Type P3 or P4 (see Section 4.4.2). Selection is based on channel conditions. For MAP elements, this field is Reserved.
BITS_PER_ACMT_SYMBOL	The total number of bits per ACMT symbol, calculated from the Modulation Profile.
CHANNEL_USABLE	Defines if the bandwidth passes the Admission Limit (Section 8.1.5) during Admission or Minimum Link Throughput (Section 8.1.6) during LMO.
CP_LENGTH	Cyclic Prefix length to be used in future unicast transmissions. May also used to calculate the CP length for GCD transmissions.
TPC_BACKOFF_MAJOR	Outer Loop Power Control backoff
TPC_BACKOFF_MINOR	Outer Loop Power Control backoff
SC_MOD	Modulation Profile

	by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32)
determining the common bit-loading modulation scheme from the received plurality of response signals;	The Accused MoCA Instrumentalities operate to determine the common bit-loading modulation scheme from the received plurality of response signals as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine the common bit-loading modulation scheme from the received plurality of response signals. "PHY Profile – A set of parameters that defines the modulation between two nodes, including the preamble type, Cyclic Prefix length, Modulation Profile, and transmit power." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Broadcast Bit Loading (BBL) – This transmission format is used by each node when transmitting simultaneously to all nodes in the network. The transmission format is derived by each transmitting node to be the common set of transmission parameters based on unicast transmission format from the transmitting node to each other node in the network." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Greatest Common Density (GCD) - A modulation format computed by a node for transmission to multiple recipient nodes. For the GCD format, the modulation density used for each subcarrier is chosen to be the greatest possible constellation density that is less than or equal to the constellation density for that subcarrier as

	reported in the most recent Type I Probe Report the node sent to each of the other nodes in which the node indicated CHANNEL_USABLE = 0x01." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1) "A receiving node processes this [Type I: Modulation Profile Probe] to generate a modulation profile of QAM constellations. The modulation profile is transmitted back to the node that generated the probe so that the node knows which modulation profile to select when transmitting to that receiving node (for a description of PHY probe processing by the MAC see Section 3.13)." (MoCA 1.0, Section 4.5.1. *See also* MoCA 1.1, Section 4.5.1, MoCA 2.0, Section 8.3.4.1.10) "The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received

	by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32)
receiving the probe signal at one receiving node of the plurality of receiving nodes through a channel path of transmission;	The Accused MoCA Instrumentalities operate to receive the probe signal at one receiving node of the plurality of receiving nodes through a channel path of transmission as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that receive the probe signal at one receiving node of the plurality of receiving nodes through a channel path of transmission. "While it is physically a shared medium, the logical network model is a fully meshed collection of point-to-point links, each with its own unique channel characteristics and channel capacity. MoCA devices use optimized PHY parameters between every point to point link. Each set of optimized PHY parameters is called a PHY Profile. Because each link is unique, it is critical that all nodes know the source and the destination for every transmission." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2; MoCA 2.0, Section 1.2.2)

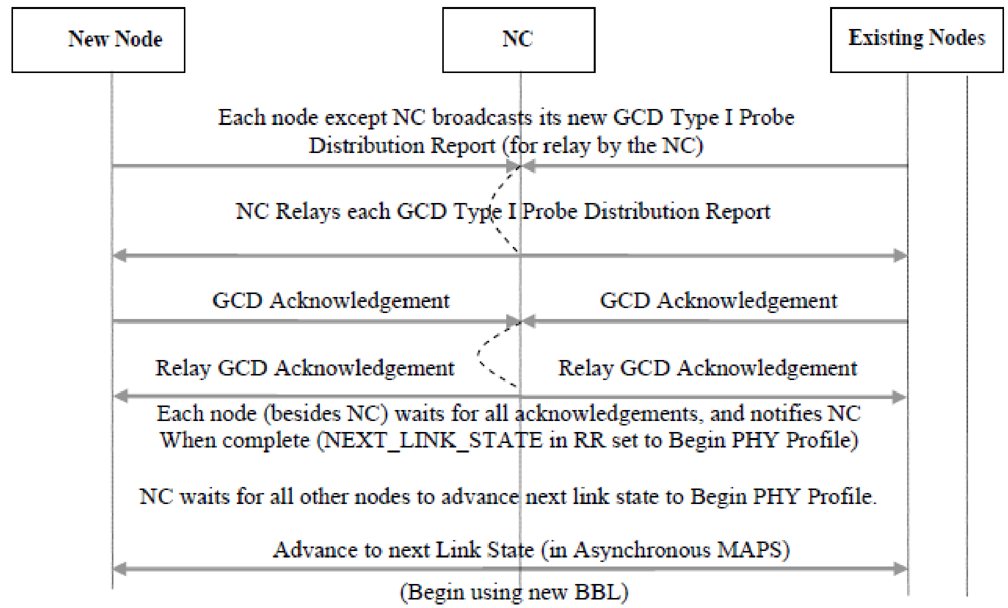


Figure 3-10. Messages Exchanged during the New Node GCD Distribution State

(MoCA 1.0, Figure 3-10. *See also* MoCA 1.1, Figure 3-12; MoCA 2.0, Figure 8-11)

"Following the Type I Probe Report from the NN and ENs, the NC MUST relay the report to the other nodes in the network. The NC MUST NOT change the Type I Probe Report payload when relaying the information." (MoCA 1.0, Section 3.6.6.2. *See also* MoCA 1.1, Section 3.6.6.2, MoCA 2.0, Section 8.3.4.1.9)

"Each node, upon receiving GCD Distribution report from another node, MUST send this acknowledgement to the sender node (relayed via the NC). Also, each node MUST start reporting "Begin PHY Profile" state in its reservation request

	after it has received the acknowledgments and GCD Distribution reports from all other nodes." (MoCA 1.0, Section 3.6.6.3. *See also* MoCA 1.1, Section 3.6.6.3, MoCA 2.0, Section 8.3.4.1.10) "The topology of the in-home coax typically results in a multi-path delay profile. Because the echoes can be stronger and/or weaker than the original signal, depending on the output port-to-output port isolation of the jumped splitter, the channel is said to have either pre- or post-echoes, respectively. A zero decibel echo, i.e., equal power to the main path, leads to deep nulls in the frequency domain spectrum. In order to achieve target packet error rates of less than 10-5 for large packets (>1500 bytes) with no retransmissions, the MoCA physical layer uses channel pre-equalization (using bit loading) and multi-tone modulation on all links." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2) "ACMT is a variation of orthogonal frequency division multiplexing (OFDM) where knowledge of the channel is used to pre-equalize all signals using variable bitloading on all subcarriers. The term used to describe the bitloading of the ACMT subcarriers is "modulation profile" and the process of creating a modulation profile between a node pair is called "modulation profiling". During periodic modulation profiling, probes are sent between all nodes and analyzed. After probe analysis, modulation profiles are chosen to optimize individual link throughput while maintaining a low packet error rate." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5) "A variety of physical layer frequency-domain and time-domain probes are

	used to create modulation profiles, optimize performance, and allow for various calibration mechanisms. Type I Modulation Profile Probes are frequency domain probes used to determine modulation profiles of the channel between any two nodes. Type II Probes are frequency domain probes consisting of two tones that may be used to fine tune performance. A Type III Echo Profile Probe may be used to determine the impulse response of the channel. This information can be used to optimize various physical layer parameters. In addition to the above probes, this specification provides opportunities for various unique Loopback Transmissions which may be useful for RF calibration, among other things." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2)
determining the transmission characteristics of the channel path at the one receiving node;	The Accused MoCA Instrumentalities operate to determine the transmission characteristics of the channel path at the one receiving node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine the transmission characteristics of the channel path at the one receiving node. "The logical network model is significantly different than the physical network. Because of the effects of splitter jumping and reflections, the channel characteristics for a link between two nodes may be dramatically different than a link between any other two nodes. Channel characteristics are also sensitive to the direction of the communication, so a reverse path may be different than the forward path." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 1.2.2)

	"In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node. (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1) "The PHY packets are categorized into two types as shown in Table 4-1. PHY data packets transport MAC data frames (e.g. containing application layer data and MoCA Network control data). PHY probe packets transport information used to characterize the communication medium and optimize physical layer performance." (MoCA 1.0, Section 4.2. *See also* MoCA 1.1, Section 4.2, MoCA 2.0, Section 14.2.2.1)
transmitting a response signal from the one receiving node to the transmitting node,	The Accused MoCA Instrumentalities operate to transmit a response signal from the one receiving node to the transmitting node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that transmit a response signal from the one receiving node to the transmitting node. "Each node, upon receiving GCD Distribution report from another node, MUST send this acknowledgement to the sender node (relayed via the NC). Also, each node MUST start reporting "Begin PHY Profile" state in its reservation request

	after it has received the acknowledgments and GCD Distribution reports from all other nodes." (MoCA 1.0, Section 3.6.6.3. *See also* MoCA 1.1, Section 3.6.6.3, MoCA 2.0, Section 8.3.7)
wherein the transmission characteristics of the channel path are determined by measuring the bit-error rate ("BER") characteristics of the received probe signal at the one receiving node and	The transmission characteristics of the channel path are determined by measuring the bit-error rate ("BER") characteristics of the received probe signal at the one receiving node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine the transmission characteristics of the channel path by measuring the bit-error rate ("BER") characteristics of the received probe signal at the one receiving node. "The topology of the in-home coax typically results in a multi-path delay profile. Because the echoes can be stronger and/or weaker than the original signal, depending on the output port-to-output port isolation of the jumped splitter, the channel is said to have either pre- or post-echoes, respectively. A zero decibel echo, i.e., equal power to the main path, leads to deep nulls in the frequency domain spectrum. In order to achieve target packet error rates of less than 10-5 for large packets (>1500 bytes) with no retransmissions, the MoCA physical layer uses channel pre-equalization (using bit loading) and multi-tone modulation on all links." (MoCA 1.0, Section 2.2. *See also* MoCA 1.1, Section 2.2; MoCA 2.0, Section 5.2) "The Type I Probe Report conveys critical information about channel conditions such as Modulation Profile and Power Control. The calculated parameters of this report are derived from Type I and optionally from Type III Probes and are

	described in Table 3-27. These parameters are to be used in future transmissions to the node that sent the report." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Section 8.3.4.1.7) **Table 3-27. Type I Probe Report Calculated Parameters** (table below) (MoCA 1.0, Table 3-27. *See also* MoCA 1.1, Table 3-33, MoCA 2.0, Table 6-32)

Parameter	Explanation
PREAMBLE_TYPE	Preamble Type P3 or P4 (see Section 4.4.2). Selection is based on channel conditions. For MAP elements, this field is Reserved.
BITS_PER_ACMT_SYMBOL	The total number of bits per ACMT symbol, calculated from the Modulation Profile.
CHANNEL_USABLE	Defines if the bandwidth passes the Admission Limit (Section 8.1.5) during Admission or Minimum Link Throughput (Section 8.1.6) during LMO.
CP_LENGTH	Cyclic Prefix length to be used in future unicast transmissions. May also used to calculate the CP length for GCD transmissions.
TPC_BACKOFF_MAJOR	Outer Loop Power Control backoff
TPC_BACKOFF_MINOR	Outer Loop Power Control backoff
SC_MOD	Modulation Profile

	"The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously." (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32) *See also* MoCA 1.0, Section 8; MoCA 1.1, Section 8, MoCA 2.0, Section 16. "Modulation Profiling – The process of optimizing the Modulation Profile of the ACMT signal to achieve a high data rate and low packet error rate for a node to node link." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "The MoCA physical layer (PHY) utilizes a modulation technique named Adaptive Constellation Multi-tone (ACMT). ACMT is a variation of orthogonal frequency division multiplexing (OFDM) where knowledge of the channel is used to pre-equalize all signals using variable bitloading on all subcarriers. The term used to describe the bitloading of the ACMT subcarriers is "modulation profile" and the process of creating a modulation profile between a node pair is called "modulation profiling". During periodic modulation profiling, probes are sent between all nodes and analyzed. After probe analysis, modulation profiles are chosen to optimize individual link throughput while maintaining a low packet error rate (PER). For each active ACMT subcarrier, the QAM constellation can vary from 1 to 8 bits per symbol (BPSK through 256QAM). Individual

	subcarriers can also be turned off. As a result, the number of bits per ACMT symbol varies as a function of the channel path." (MoCA 1.0, Section 2.2. See also MoCA 1.1, Section 2.2; MoCA 2.0, Section 5) "Packet Error Rate (PER) – The ratio between (1) the total number of Ethernet packets with a destination address associated with the receiving Node received at the transmitting Node's ECL (total number of transmitted packets) minus the number of Ethernet packets received by the receiving Node from the transmitting Node and forwarded to its ECL with no CRC errors and (2) the total number of transmitted packets, when the total number of transmitted packets is at least 10,000,000" (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "The MoCA channel characteristics vary considerably between different existing coax home cabling as well as across different RF channels. Since the MoCA system adapts to the channel characteristics, if a MoCA Network is able to form in a coax network, the network MUST operate with a PER $\leq 10^{-5}$ as long as the delay spread is under 800 nanoseconds and external interference is not present. The PER is measured over a minimum of 10 million total packets." (MoCA 1.0, Section 8.1.1. *See also* MoCA 1.1, Section 8.1.1, MoCA 2.0, Section 16.3)
generating the response signal, wherein the response signal utilizes a bit-loading modulation scheme that is generated by the one receiving node in response to determining the transmission characteristics of the channel path,	The Accused MoCA Instrumentalities operate to generate the response signal, wherein the response signal utilizes a bit-loading modulation scheme that is generated by the one receiving node in response to determining the transmission characteristics of the channel path as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that generate the response signal, wherein the response signal utilizes a bit-loading

	modulation scheme that is generated by the one receiving node in response to determining the transmission characteristics of the channel path. "GCD PHY Profile Transmission from NN and ENs: This message is sent by each node, except NC, to all other nodes (including NC). This report is sent in the form of a Type I Probe Report (Section 3.6.3.2) with RELAY_FLAG = 1 for NC to relay the report to the rest of the nodes in the network. The report informs receiving nodes of the PHY profile that the node wishes to use for broadcast messages and asynchronous MAPs (if the node becomes NC)." (MoCA 1.0, Section 3.6.6.1. *See also* MoCA 1.1, Section 3.6.6.1, MoCA 2.0, Section 8.3.7) "Each node, upon receiving GCD Distribution report from another node, MUST send this acknowledgement to the sender node (relayed via the NC). Also, each node MUST start reporting "Begin PHY Profile" state in its reservation request after it has received the acknowledgments and GCD Distribution reports from all other nodes." (MoCA 1.0, Section 3.6.6.3. *See also* MoCA 1.1, Section 3.6.6.3, MoCA 2.0, Section 8.3.7) "Once each node begins to send "Begin PHY Profile" state in its reservation request the NC MUST advance the Link Control state to Begin PHY Profile state. When EN's and NN receive this Link Control state indication, they can begin using newly computed PHY profiles (including transmit power settings) as described in Section 3.13.3." (MoCA 1.0, Section 3.6.7. *See also* MoCA 1.1, Section 3.6.7, MoCA 2.0, Section 8.3.9)
wherein determining a common bit-loading modulation scheme includes: comparing a	Determining a common bit-loading modulation scheme includes comparing a plurality of bit-loading modulation schemes from the corresponding received

plurality of bit-loading modulation schemes from the corresponding received plurality of response signals; and determining the common bit-loading modulation scheme in response to comparing the plurality of bit-loaded modulation schemes.	plurality of response signals; and determining the common bit-loading modulation scheme in response to comparing the plurality of bit-loaded modulation schemes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that determine a common bit-loading modulation scheme by at least comparing a plurality of bit-loading modulation schemes from the corresponding received plurality of response signals; and determining the common bit-loading modulation scheme in response to comparing the plurality of bit-loaded modulation schemes. "PHY Profile – A set of parameters that defines the modulation between two nodes, including the preamble type, Cyclic Prefix length, Modulation Profile, and transmit power." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Broadcast Bit Loading (BBL) – This transmission format is used by each node when transmitting simultaneously to all nodes in the network. The transmission format is derived by each transmitting node to be the common set of transmission parameters based on unicast transmission format from the transmitting node to each other node in the network." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "Greatest Common Density (GCD) - A modulation format computed by a node for transmission to multiple recipient nodes. For the GCD format, the modulation density used for each subcarrier is chosen to be the greatest possible constellation density that is less than or equal to the constellation density for that subcarrier as

	reported in the most recent Type I Probe Report the node sent to each of the other nodes in which the node indicated CHANNEL_USABLE = 0x01." (MoCA 1.0, Section 1.2. *See also* MoCA 1.1, Section 1.2, MoCA 2.0, Section 3) "In addition to the point-to-point communication, the MoCA protocol supports broadcast and multicast capabilities. When transmitting to multiple devices, a node must find a set of PHY parameters that all the other nodes can receive. Even though two links from a given transmitter may have the same channel capacity, their individual link characteristics may be drastically different. A common set of PHY parameters that both receive nodes can receive may have less capacity. For broadcast and multicast transmissions, a node must calculate a Broadcast Bitloading (BBL) profile for all nodes that may receive the packet from this node." (MoCA 1.0, Section 2.1.2. *See also* MoCA 1.1, Section 2.1.2, MoCA 2.0, Section 5.3.1) "A receiving node processes this [Type I: Modulation Profile Probe] to generate a modulation profile of QAM constellations. The modulation profile is transmitted back to the node that generated the probe so that the node knows which modulation profile to select when transmitting to that receiving node (for a description of PHY probe processing by the MAC see Section 3.13)." (MoCA 1.0, Section 4.5.1. *See also* MoCA 1.1, Section 4.5.1, MoCA 2.0, Section 8.3.4.1.10) "The SC_MOD parameter is used to define the Modulation Profiles for both unicast packets and GCD packets. Unicast packet Modulation Profiles are derived from the Type I Probe. GCD Modulation Profiles are derived from Type I Probe Reports obtained from all nodes. Because GCD packets must be received

	by multiple nodes, the GCD Modulation Profile MUST be selected to support the required PER to all receiving nodes simultaneously.” (MoCA 1.0, Section 3.13.3.1. *See also* MoCA 1.1, Section 3.13.3.1, MoCA 2.0, Table 6-32)